

## Formats for Supply and Updating of Data for \*\*\* ABLOADS \*\*\*

last updated 06/10/08

Throughout this document, **fields providing data essential to program operation are shown bold**. Fields containing very desirable information which will be displayed and utilised if available are shown in normal text. *Other useful fields are shown in italics*.

### Bridges Data

New and update bridge data may now be supplied in a Microsoft Access 97 database (\*.mdb), in dBase tables (\*.dbf) or as Excel or Lotus spreadsheets (\*.xls, \*.wk3 & \*.wk4). Data may also be supplied in text delimited or other common data format, and Cascade will process it appropriately. Other data formats may be used by agreement with Cascade. There are no restrictions on table/worksheet or field/column heading names, as these are matched during the data import procedure in \*\*\* ABLOADS \*\*\* to the table and field names set out in the tables below, but it must be clear from the names, data or accompanying notes what data each field/column contains.

Alternatively, data may be entered manually within \*\*\* ABLOADS \*\*\* itself, although this is clearly a laborious slow process if the number of structures is significant. If this path is chosen, it is still better to enter the basic bridge data (as listed in the Bridges table below) using the automatic field matching import facility provided within the program, following up manually with assessment and dimensional data as this becomes available.

The table layouts that follow show how the various data tables in the Local.mdb database in \*\*\* ABLOADS \*\*\* are set out. In whatever format the data is supplied, it must match the general framework of these tables to allow automatic import.

Therefore, basic bridge data should be supplied set out to match the Bridges table below.

| Bridges               |   |           |      |
|-----------------------|---|-----------|------|
| field name            | comments (SMIS data comments in brackets)   | data type | size |
| <b>BridgeNo</b>       | bridge no & bridge no suffix together to be unique (unique Structure Key)   | text      | 5    |
| <b>BridgeNoSuffix</b> | bridge no suffix if any (not used for SMIS)   | text      | 5    |
| <b>BridgeName</b>     | bridge name (Structure Name)  | text      | 60   |
| <i>BridgeCat</i>      | bridge category (Structure Type can be used)  | text      | 10   |
| <i>BridgeLoc</i>      | bridge location & sufficient information to determine road over / road under (Structure Number – the location of the structure in chainage terms) | text      | 35   |
| <i>BridgeDescr</i>    | bridge description (any available information)  | text      | 60   |
| <i>BridgeOSSquare</i> | bridge OS square (not used)   | text      | 10   |

|                         |   |      |    |
|-------------------------|---|------|----|
| <b>BridgeE</b>          | bridge easting in metres (OS Grid Reference East)       | long | 4  |
| <b>BridgeN</b>          | bridge northing in metres (OS Grid Reference North)     | long | 4  |
| <i>BridgeBRNo</i>       | Network Rail bridge no in numeric characters (not used) | text | 5  |
| <i>BridgeBRNoSuffix</i> | Network Rail suffix in letter characters (not used)     | text | 3  |
| BridgeOverUnder         | 'o' - overbridge, 'u' – underbridge (not used)          | text | 1  |
| BridgeOwner             | bridge owner (Custodian)                                | text | 15 |
| <i>BridgeStatus</i>     | bridge status information (Network Status)              | text | 15 |

Only supply data for entry in the AssessResults table if there is assessment capacity or weight limit restriction information available for the bridge concerned.

| <b>AssessResults</b>  |  |           |      |
|-----------------------|--|-----------|------|
| field name            | comments   | data type | size |
| <b>BridgeNo</b>       | as above   | text      | 5    |
| <b>BridgeNoSuffix</b> | as above   | text      | 5    |
| <b>BridgeType</b>     | 'arch', 'span', 'box', 'port', 'pipe' or 'spec'ial – use the exact characters shown within the apostrophes             | text      | 4    |
| <b>NumSpans</b>       | no of spans comprising the bridge  | text      | 2    |
| <b>ALL</b>            | Assessment Live Loading capacity or equivalent design value eg HA/2 or leave as null                                   | text      | 5    |
| HB                    | assessed or designed HB capacity in units or null  | text      | 5    |
| WtLimit               | legal weight limit in tonnes or null   | text      | 5    |
| EnvWtLimit            | environmental limit (or special limit – add 'w' for max vehicle or 'a' for max axle weight) in tonnes or leave as null | text      | 5    |
| Comments              | any useful information concerning the bridge   | memo      |      |

Only supply data for entry in the following tables where dimensional data is available. Supply data for 'arch' bridges in this table.

| <b>AssessArchResults</b> |   |           |      |
|--------------------------|---|-----------|------|
| field name               | comments  | data type | size |
| <b>BridgeNo</b>          | as above  | text      | 5    |
| <b>BridgeNoSuffix</b>    | as above  | text      | 5    |
| <b>SpanNo</b>            | sequential span no  | text      | 2    |
| <b>ArchType</b>          | 'c'-circular or segmental, 'p'-parabolic, 'e'-elliptical, 'po'-pointed, 'i'-irregular | text      | 2    |
| <b>Span</b>              | span length in metres   | text      | 5    |
| <b>Quarter</b>           | quarter point height in metres (not needed for 'c')                                   | text      | 5    |
| <b>Crown</b>             | crown height in metres  | text      | 5    |
| <b>Thick</b>             | arch barrel thickness in metres   | text      | 5    |
| <b>Cover</b>             | cover over arch barrel top to road in metres  | text      | 5    |

Supply data for 'span', 'box and 'portal' type bridges in this table.

| <b>AssessSpanResults</b> |          |           |      |
|--------------------------|----------|-----------|------|
| field name               | comments | data type | size |

|                       |  |      |   |
|-----------------------|--|------|---|
| <b>BridgeNo</b>       | as above   | text | 5 |
| <b>BridgeNoSuffix</b> | as above   | text | 5 |
| <b>SpanNo</b>         | sequential span no   | text | 2 |
| <b>Span</b>           | span length in metres  | text | 5 |
| <b>Fixity</b>         | simplified end fixities using 'p'-pinned & 'f'-fixed<br>ie 'pp'-simply supported, 'ff'-fixed, 'pf' or 'fp' | text | 2 |

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Supply data for 'spec'ial bridges (eg cantilever/suspended span, concrete arches or large concrete or Armco pipes) in two tables, **AssessSpecResults** and **AssessSpecMbrs**. The first table contains overall span details similar to those for 'span' bridges. To compile the second table, set up a simple two dimensional model of the structure (deck only if simply supported) and enter the member details in the second table.

Supply data for 'spec'ial bridge spans in this table.

| <b>AssessSpecResults</b> |   |           |      |
|--------------------------|---|-----------|------|
| field name               | comments  | data type | size |
| <b>BridgeNo</b>          | as above  | text      | 5    |
| <b>BridgeNoSuffix</b>    | as above  | text      | 5    |
| <b>SpanNo</b>            | sequential span no  | text      | 2    |
| <b>Span</b>              | span length in metres   | text      | 5    |
| <b>Fixity</b>            | simplified <b>deck member</b> end fixities using 'p'-<br>pinned & 'f'-fixed ie 'pp'-simply supported, etc | text      | 2    |
| AnalFile                 | *** ANALYSE *** *.dtl file name or leave as a<br>null field   | text      | 12   |

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Supply data for 'spec'ial bridge members in this table.

| <b>AssessSpecMbrs</b> |                                    |           |      |
|-----------------------|------------------------------------|-----------|------|
| field name            | comments                           | data type | size |
| <b>BridgeNo</b>       | as above                           | text      | 5    |
| <b>BridgeNoSuffix</b> | as above                           | text      | 5    |
| <b>Member</b>         | sequential member no               | integer   | 2    |
| <b>X1</b>             | span start X co-ordinate in metres | single    | 4    |
| <b>Y1</b>             | span start Y co-ordinate in metres | single    | 4    |
| <b>X2</b>             | span end X co-ordinate in metres   | single    | 4    |
| <b>Y2</b>             | span end Y co-ordinate in metres   | single    | 4    |
| <b>Lfix</b>           | see Annex                          | text      | 4    |
| <b>Rfix</b>           | see Annex                          | text      | 4    |
| <b>Material</b>       | see Annex                          | text      | 4    |
| <b>Details</b>        | see Annex                          | text      | 16   |
| <b>Dimn1</b>          | see Annex                          | integer   | 2    |
| <b>Dimn2</b>          | see Annex                          | integer   | 2    |
| <b>Dimn3</b>          | see Annex                          | integer   | 2    |
| <b>Dimn4</b>          | see Annex                          | integer   | 2    |
| A                     | see Annex                          | single    | 4    |
| Ay                    | see Annex                          | single    | 4    |
| J                     | see Annex                          | single    | 4    |
| Mofl                  | see Annex                          | single    | 4    |
| E                     | see Annex                          | single    | 4    |

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Fuller information on special member properties is available in the abridged Help file topic annexed hereto. There is provision within the program to enter special member details directly if so desired and an **\*\*\* ANALYSE \*\*\*** \*.dtl file is not available.

Only supply data for the ArchCoords table where ArchTypes ‘i’ or ‘po’ (irregular or pointed) have been entered in the AssessArchResults table data. Up to 11 sets may be supplied, and the BridgeX values must start at 0 and finish at the span value. BridgeX is required, with either BridgeY or BridgeThick, or both. Pointed arches should have two identical sets at the apex.

| <b>ArchCoords</b>      |   |           |      |
|------------------------|---|-----------|------|
| field name             | comments  | data type | size |
| <b>BridgeNo</b>        | as above  | text      | 5    |
| <b>BridgeNoSuffix</b>  | as above  | text      | 5    |
| <b>SpanNo</b>          | as above  | text      | 2    |
| <b>BridgeX(0)-(10)</b> | distance from origin arch springing in metres             | text      | 5    |
| BridgeY(0)-(10)        | height of arch intrados at BridgeX in metres              | text      | 5    |
| BridgeThick(0)-(10)    | arch barrel thickness normal to arch at BridgeX in metres | text      | 5    |

Supply height clearance data for overbridges in this table. Actual height clearances can be used as there is provision for conversion to safe clearances within the program, but this should be made very clear in accompanying notes. **\*\*\* ABLOADS \*\*\*** now undertakes conversion between safe and actual clearance heights by adding/subtracting 0.075m (rounded to 0.08m).

| <b>HeightLimits</b>   |  |           |      |
|-----------------------|--|-----------|------|
| field name            | comments   | data type | size |
| <b>BridgeNo</b>       | as above   | text      | 5    |
| <b>BridgeNoSuffix</b> | as above   | text      | 5    |
| <b>HtLimit</b>        | <b>safe</b> height clearance in metres                                       | text      | 5    |
| HtLimitLocn           | height clearance location description (bridge crossing several carriageways) | text      | 20   |

### Road & Topographical Data

(not applicable to **\*\*\* ABLOADS Management \*\*\***)

The program identifies bridges to be checked for a particular notified vehicle by looking at the road segment labels of a selected route and finding the bridge mapping records to which those labels have been attached. The same process applies to other road segment related information, for example restrictions. The essence of the graphical display is therefore that each bridge mapping record must be associated with a unique road segment label. Experience has shown that the best way of associating a bridge mapping record correctly with a road segment label initially is to undertake the association manually on screen, a somewhat onerous task but one which is normally required only once when the program is first set up.

For route selection the program requires that road segments are divided right down to a junction to junction basis – a roundabout, for example, will comprise many segments. Most local authority GIS data does do this, as does OS MasterMap and (now discontinued) OSCAR data. If it happens that GIS data has several segments with the same label, the program takes care of the situation by assigning numerical suffixes to otherwise identical segment labels.

Topographical data, particularly rivers, waterways and railways, is almost essential to sensible program operation, indicating as it does the physical routing constraints of the area and obvious

bridge locations. We have received satisfactory topographical data extracted from OS 1:1250/1:2500 'tiles', and from MasterMap. Shorelines and local authority area boundaries are also desirable features to include.

The program requires that graphical data should be supplied as a series of ArcView Shapefiles. This could change in the future, but the reason for this is that the Shapefile is a fully documented open format, and the graphical data thus presented is readily available for processing by the program. Shapefiles as imported into the program comprise three separate data files: a co-ordinates file \*.shp, a co-ordinates index file \*.shx and a dBaseIV attributes file \*.dbf. Other shapefile component files are not required. Shapefiles should be 'polyline' Shapefiles.

A set of data not presented as a Shapefile needs to be a series of co-ordinate pairs defining the full shape of the road segment from start to end, related by means of a record no to at least the necessary attribute information set out in the \*seg.dbf table below.

The prefixes '\*' to the Shapefiles used by the program are as follows:-

| prefix  | containing   |
|---|--|
| ?segs where usually '?' = 'M', 'T' & 'A' to 'E' or 'U' (unclassified) & 'P' (private) | road segment data divided by road classification – <b>particularly split 'T'runk and 'A' class roads</b> |
| ?segs where usually '?' = (say) 'W', 'X', 'Y' & 'Z'                                   | topographical segment data by type, ie boundary, railways, rivers/lakes                                  |

The shapefile sets **must** be given these prefixes. For example, the shapefile set containing motorway mapping data will be Msegs.shx, Msegs.shp and Msegs.dbf. The file 'Ssegs.cox' is reserved for restrictions data, and the file 'Segs.cox' for bridge mapping records, so do **NOT** use either the prefix 'S' or no prefix at all.

Data from authorities who cannot provide data in ArcView Shapefile format, but which nevertheless contains the minimum requirements set out below, will require pre-processing or customisation by Cascade which will involve an additional charge.

As with bridge structure data, there are no restrictions on \*segs.dbf field names, as these are matched during the import procedure in **\*\*\* ABLOADS \*\*\*** to the field names set out in the tables below, but it must be clear from the names, data or accompanying notes what data each field contains.

\*seg.dbf road data attribute files should therefore contain minimum data as follows:-

| field name    | *seg.dbf<br>comments   | data type | size |
|---------------|--|-----------|------|
| <b>RName</b>  | the road name ie ' <b>High Street</b> ' *  | text      | 32   |
| <b>RNumb</b>  | the road classification no ie ' <b>A448(T)</b> ' *   | text      | 8    |
| RParish       | the parish/place in which the segment is located *   | text      | 30   |
| XStart        | Easting for segment start  | long      | 4    |
| YStart        | Northing for segment start   | long      | 4    |
| MidX          | Easting for segment mid-point  | long      | 4    |
| MidY          | Northing for segment mid-point   | long      | 4    |
| XEnd          | Easting for segment end  | long      | 4    |
| YEnd          | Northing for segment end   | long      | 4    |
| <b>RLabel</b> | unique (but see below) road segment label *  | text      | 20   |
| Direction     | generally ' <b>N</b> ' for two way, '+' for one way from start to end, '-' for the reverse | text      | 1    |

\* not required for topo data

Some comments on the importance of these attributes follows:-

- the road name and number are used for the mapping display, and the road names form the basis of the program's gazetteer. Both of these are essential in selecting local route elements and finding origins and destinations. The parish/place is most desirable. It is used to distinguish similar road names in different places, and if not available the program utilises an OS square reference.
- start and end co-ordinates are used to ensure segment connection and therefore route continuity, but if not available they are generated by the program from the co-ordinate data
- the mid-point co-ordinates are important in segment selection and deselection, but if not available they are generated by the program from the co-ordinate data
- a unique road segment label, the Chart section label or the OS MasterMap or OSCAR reference, **is indispensable**
- the direction of traffic flow. The symbols indicated may be added to in due course

### Restrictions Data

(not applicable to **\*\*\* ABLOADS Management \*\*\***)

As with bridge data, new restrictions data may be supplied in a Microsoft Access 97 database (\*.mdb), in dBase tables (\*.dbf) or as Excel or Lotus spreadsheets (\*.xls, \*.wk3 & \*.wk4). Data may also be supplied in text delimited or other common data format. There are no restrictions on table/worksheet or field/column heading names, as these are matched during the data import procedure in **\*\*\* ABLOADS \*\*\*** to the table and field names set out in the tables below, but it must be clear from the names, data or accompanying notes what data each field/column contains.

**Restrictions data will generally and best be entered manually** within **\*\*\* ABLOADS \*\*\*** itself by selecting the road segments to which the restriction is to apply and then adding the restriction type, value and any other relevant properties.

The table layout that follows show how the DummyRestrictionsAttributes table in the Local.mdb database in **\*\*\* ABLOADS \*\*\*** is set out. In whatever format the data is supplied, it must match the general framework of this table to allow automatic import.

Bulk restrictions files should therefore contain data set out as follows:-

| <b>Restrictions</b> |          |           |      |
|---------------------|----------|-----------|------|
| field name          | comments | data type | size |

|                        |  |           |     |
|------------------------|--|-----------|-----|
| <i>RName</i>           | the road name ie ' <b>High Street</b> ' *  | text      | 32  |
| RNumb                  | the road classification no ie ' <b>A448(T)</b> ' *                               | text      | 8   |
| RLabel                 | unique (but see below) road segment label *                                      | text      | 20  |
| <i>X1</i>              | Easting for the mid-point start of a segment run                                 | long      | 4   |
| <i>Y1</i>              | Northing for the mid-point start of a segment run                                | long      | 4   |
| MidX                   | Easting for the attached segment mid-point                                       | long      | 4   |
| MidY                   | Northing for the attached segment mid-point                                      | long      | 4   |
| <i>X2</i>              | Easting for the mid-point end of a segment run                                   | long      | 4   |
| <i>Y2</i>              | Northing for the mid-point end of a segment run                                  | long      | 4   |
| <b>Type</b>            | currently 0-roadworks, 1-weight, 2-height, 3-width, 4-length, 5-speed, 6-closure | integer   | 2   |
| <b>Value</b>           | required for types 1 – 5 in metres/tonnes/mph                                    | single    | 4   |
| Action                 | whether mandatory or advisory, types 0 & 5 always advisory, 6 always mandatory   | integer   | 2   |
| <i>StartTime/Date</i>  | or leave empty   | date/time | 8   |
| <i>FinishTime/Date</i> | or leave empty   | date/time | 8   |
| <i>Description</i>     | or leave empty   | text      | 200 |

\* not required for topo data

Bulk data needs to have either a road segment label or the correct segment mid-point Easting and Northing (for immediate segment attachment). Entry of just a road classification number will result in the generation of a new unattached restriction close to a segment of that road, requiring manual on-screen attachment to a road segment or run of road segments. Entry of a road number together with start and end Eastings and Northings will generate restrictions attached to all road segments of that road no within the square formed by those co-ordinates. Restrictions without a finish date will remain active until manually deleted.

## Annex Special member details

The program provides for entry and display of member details and dimensions and comparative assessment data for 'spec'ial type bridges. Bear in mind when modelling a special bridge that an approximate model is all that is required for comparative assessment – just try to get the relative member dimensions and properties generally in proportion.

For each member, enter the following data:-

- start and end member co-ordinates in millimetres - don't forget to include the piers in your model if they have any fixed connection with the deck
- the member material, 'c' – concrete of stated characteristic strength ie 'c60', 's' – steel, 't' – timber of stated strength class ie 't4' or 'o' – some other material
- start and end member fixities, for externally unsupported members the symbols used are 'p' for a pinned end, 'f' for a fixed end and ' ' for a free end, whilst supported member fixities are a combination of 'X' – fixed horizontally, 'Y' – fixed vertically and 'z' – fixed against rotation, eg XYZ is fully fixed
- the member shape, 'rect', 'circle', 'isect', 'tsect', 'channel' or 'angle'
- four member cross-section dimensions in millimetres, width/radius, depth/radius and wall thicknesses. The 'rect'angle and 'circle'/ellipse shapes are made hollow by specifying wall thicknesses as the third and fourth dimension
- section properties, area in metres<sup>2</sup>, moment of inertia in metres<sup>4</sup> and modulus of elasticity in kN/mm<sup>2</sup> are calculated as the dimensions entered, but may be entered directly
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06/JMW/jw/14/08/00

First issued 14/08/00

BridgeNoSuffix field size increased from 1 to 5 22/11/00

Unnecessary fields removed, updated 16/10/01

Minor update 17/12/02

Updated, particularly wrt height limit data 30/05/03

Bridges table field sizes enlarged for MAC use 30/06/03

Spreadsheet processing added & minor amendments 3/10/03

Pipe/special bridge relationship clarified 4/11/03

Comments field entered in AssessResults 10/03/04

Bridge data processing and updating merged 09/02/05

Better info re SMIS data in Bridges table, and general updating 15/09/05

Minor update 6/12/05

Height limits conversion changed 22/02/07

Restrictions data added 29/05/07

Restrictions data amended 29/05/07

Minor amendments 06/09/07

Direction field added & minor amendments 17/04/08

AssessSpecMbrs table and Special members Annex added 06/10/08

At the current time we are informed by Ordnance Survey that MasterMap ITN is only available to government organisations such as Highways Agency Agents under the PGA without Road Route Information (RRI), but is available with RRI to local government customers under the MSA.